

REMARKS

Claims 35-65 are pending. Claims 45, 57 and 59 have been amended. No new matter has been added by virtue of the amendments; support for the new claims appears throughout the specification and in the original claims of the application.

Referring to the Office Action, the disclosure was objected to at page 3, line 17, for referencing particular claims. The text has been suitably corrected; thus, withdrawal of the objection is requested.

Claims 45 and 47 were rejected under 35 USC §112, 2nd paragraph. The Office Action points to claims 45 and 57 and asserts a lack of clarity and antecedent basis. The noted claims have been amended to address each informality; thus, withdrawal of the rejection is requested.

Claims 59-60 were objected to under 37 CFR §1.75(c), as allegedly failing to further limit the subject matter of a previous claim. Claim 59 has been amended to address the issue; thus, withdrawal of the objection is requested.

The remaining rejections are discussed in combination for the sake of brevity.

Claims 35-38, 51-55 and 58 stand rejected under 35 USC §103(a) over Kiat et al. (US 6,250,318), in view of Silvernail et al. (US 4,691,722), further in view of Johnson (US 5,334,352).

Claims 42-43, 48-50 and 58-65 stand rejected under 35 USC §103(a) over Kiat et al. (US 6,250,318), in view of Silvernail et al. (US 4,691,722), further in view of Johnson (US 5,334,352), further in view of Di Corpo (US 3,212,719).

Claims 44-46 stand rejected under 35 USC §103(a) over Kiat et al. (US 6,250,318), in view of Silvernail et al. (US 4,691,722), further in view of Johnson (US 5,334,352), further in view of Zimmer et al. (US 4,550,681).

Claim 47 stands rejected under 35 USC §103(a) over Kiat et al. (US 6,250,318), in view of Silvernail et al. (US 4,691,722), further in view of Johnson (US 5,334,352), further in view of Morine et al. (US 4,747,541).

Claims 40 and 56-58 stand rejected under 35 USC §103(a) over Kiat et al. (US 6,250,318), in view of Silvernail et al. (US 4,691,722), further in view of Johnson (US 5,334,352), further in view of Han et al. (US 5,850,841).

Each of the rejections is traversed. The noted references, even in the stated combinations, fail to teach or suggest the features of the present invention.

The presently claimed invention provides a nozzle arrangement for releasing a treatment fluid, in particular for use in continuous systems for wet-chemical treatment of printed-circuit boards, e.g., whereby this nozzle arrangement is easy to manufacture and has a stable and compact structure with an even flow speed and flow quantity of the treatment fluid in the longitudinal direction of the nozzle arrangement.

The features of the present invention are recited in independent claim 35. In particular, the nozzle arrangement of the invention has an insert held by a stiffening member in a housing. The housing has at least one fluid feed opening for feeding or supplying the treatment fluid and at least one fluid delivery opening for releasing the treatment fluid. The insert itself, which is held by the stiffening member in the housing, has a plurality of distribution openings spaced from one another in the longitudinal direction and, in addition, defines together with the housing a fluid channel having a section reducing from the fluid feed opening in the longitudinal direction of the housing,

This fluid channel is in communication with the fluid delivery opening through the fluid distribution openings, so as to supply the treatment fluid from the fluid channel through the distribution openings to the at least one fluid delivery opening.

A preferred embodiment of the invention is shown in Fig. 3 of the present application.

As discussed in the specification of the present application, as a result of the reducing cross section of the fluid channel from the fluid feed opening in the longitudinal direction of the housing, a balancing of the flow speed of the treatment fluid along the entire length of the nozzle arrangement is achieved.

In addition, the nozzle arrangement of the invention comprises only the housing, the insert and the stiffening member as separate components, whereby the insert is held by the stiffening member in the housing, as shown for example in Fig. 5 of the present application.

This particular combination of the stiffening member with the insert makes it possible for the nozzle arrangement to be manufactured at low cost and, at the same time, provides a very stable and compact construction.

Furthermore, Applicant's nozzle arrangement also ensures that a sufficient dimensional accuracy is achieved, as at least the insert and the housing of the nozzle arrangement are made from plastics which can be processed with a higher accuracy than metal, for example, and in addition is resistant to chemicals. This feature, in particular, relating to the dimensional accuracy is of utmost importance for nozzle arrangements for galvanization or electroplating systems.

According to the invention, the stiffening member is made from metal and provides the nozzle arrangement with the required stiffness.

The present invention as claimed in independent claim 35 is a particular combination of a plurality of features. By combining these features, the present inventors discovered that the noted advantages could be achieved.

In contrast to the present invention, Kiat discloses in Fig. 18 a nozzle arrangement having a longitudinal housing 1200, whereby a fluid channel 1360 is provided in the longitudinal housing to supply the treatment fluid to a plurality of fluid delivery openings 1380. The fluid channel has an insert which is shaped such that the effective cross-sectional area of the fluid channel 360 reduces from the fluid feed opening in the longitudinal direction of the nozzle arrangement.

Kiat does not disclose that the housing is made from plastic, and also does not disclose any stiffening member, especially no stiffening member made from metal; this was expressly acknowledged by the Examiner. Moreover, Kiat also fails to disclose a longitudinal insert having a plurality of distribution openings spaced from one another in the longitudinal direction thereof, as recited for in present independent claim 35. Kiat only discloses fluid delivery openings formed in the housing of the nozzle arrangement, but no fluid distribution openings are formed in the insert 1280 itself.

Silvernail et al. relates to a spray processing machine for processing silicon wafers in the manufacture of integrated circuit chips. The spray processing machine 10 includes a housing 11 made up of a substantially cylindrical bowl 12 and a cover 13 hinged to the bowl 12 being molded of plastic.

The Office Action alleges that Silvernail et al. teach a stiffening member similar to the claimed invention. In that regard, reference is made by the Examiner to

turntable 18 disclosed by Silvernail et al. Applicant respectfully submits that such an analysis of Silvernail et al. is incorrect.

Specifically, according to Silvernail et al., the turntable 18 carries and revolves a multiplicity of substrates or silicon wafers 21, whereby the turntable 18 may be made of a plastic material or of metal coated with such a plastic material (see column 3, lines 9-41 of Silvernail). Consequently, the turntable 18 of Silvernail et al. is a functional unit of the spray processing machine described in the reference, which is absolutely necessary for the functionality of this spray processing machine (see, e.g., claim 1 of Silvernail et al.). It is clearly apparent that the turntable 18 is not a stiffening element for the housing 11 of this spray processing machine, and it is also clear that the turntable 18 does not extend in the longitudinal direction of the housing; both of which are contrary to the features recited in present independent claim 35.

The description of turntable 18 in Silvernail's specification does not suggest or render obvious the claimed stiffening member. In Silvernail et al., the turntable 18 is made of plastics or of a metal coated with such plastics; in contrast, according to the present invention the housing is made from plastics and is provided with a stiffening element made from metal. According to Silvernail et al., the turntable 18 is made from a material which is highly resistant or substantially inert to the deteriorating effects of highly active chemicals used in the spray processing (see column 3, lines 37-41). Consequently, the plastic coating of the turntable 18 made from metal serves to protect the metal against the chemicals. This, however, is a different objective and a different solution relative to that of the present invention. Silvernail et al. merely discloses a combination of a metal material with a plastic material and does not teach or suggest the use of these components in a nozzle arrangement in accordance with the present application.

Silvernail et al. clearly do not disclose a turntable made from plastics having any stiffening element.

Moreover, the disclosure of the turntable 18 in Silvernail et al. does not include any suggestion that a stiffening element extending in the longitudinal direction of the housing could be provided as in the nozzle arrangement of the present invention. Silvernail et al. fail to disclose any stiffening element extending in the longitudinal direction of the housing 11 of the corresponding spray processing machine. The Office Action seems to suggest that in Silvernail et al. the longitudinal direction is the radial direction of the turntable 18. Such an interpretation seems arbitrary and as a matter of course, the teaching regarding the turntable 18 cannot be transferred from the turntable 18 to the housing due to the different geometries and functions of these components.

Consequently, the features of present invention as recited in independent claim 35, according to which the housing of the nozzle arrangement has a stiffening member made from metal with the stiffening member extending in the longitudinal direction of the housing, are not taught or suggested by Silvernail et al., even in combination with the other cited references.

Indeed, the Office Action expressly acknowledges at page 7, part 23, that a combination of Kiat with Silvernail et al. still fails to teach a longitudinal insert, in which a plurality of distribution openings is spaced from one another in the longitudinal direction. However, with respect to this particular feature, the Examiner refers to Johnson and alleges that Johnson teaches such a longitudinal insert with reference to Johnson's Figs. 2 and 6-7.

Applicant respectfully submits that such an interpretation and analysis of Johnson is also not correct.

Referring to Johnson's Figs. 2, 6 and 7, at best, Johnson discloses an insert 22 having a clearance or passage between two legs 49, 52 of the insert 22. In Johnson there is no disclosure of a plurality of distribution openings, formed integrally within the insert, as they are defined in present independent claim 35, and as they are necessary in order to fulfill the desired guide function for the flow of a treatment fluid from the channel formed within the housing to the fluid distribution openings formed in the side wall of the housing. Such a functionality of the insert of the present invention is not rendered obvious by the disclosure of Johnson. Rather, the insert 22 of Johnson is provided to clearly define and adjust the cross-sectional area 19 of the elongated cavity 13 of the corresponding manifold 10 (refer to column 3, lines 20-28 of Johnson). Thus, the functionality of the insert 22 of Johnson is completely different from the functionality of the insert of the invention as claimed in present independent claim 35. All of that said, Johnson fails to remedy the deficiencies of the other cited references in the stated rejections.

Likewise, DiCorpo, Zimmer, Morine and Han are added for their alleged teachings relative to other discrete features of the invention. In view of the deficiencies of Kiat, Silvernail and Johnson (described in detail above), it is respectfully submitted that these remaining references each fail to remedy the deficiencies of Kiat, Silvernail and Johnson and the rejections cannot properly be sustained.

To properly determine a *prima facie* case of obviousness, the Examiner "must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made." M.P.E.P § 2142. This is important as "impermissible hindsight must be avoided and the legal conclusion must be gleaned from the prior art." *Id.* Four factual inquiries must be made: first, a determination of the scope and contents of the prior art; second, a

determination of the differences between the prior art and the claims in issue; third, a determination of level of ordinary skill in the pertinent art; and fourth, an evaluation of evidence of secondary consideration. Graham v. John Deere, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966).

Three criteria may be helpful in determining whether claimed subject matter is obvious under 103(a): first, if there is some suggestion or motivation to modify or combine the cited references; second, if there is a reasonable expectation of success; and third, if the prior art references teach or suggest all the claim limitations. KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398 (2007). With regard to the first criterion, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.3d 690 (Fed. Cir. 1990). "Knowledge in the prior art of every element of a patent claim ... is not of itself sufficient to render claim obvious." Graham, 383 U.S. at 17-18; Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1333-34 (Fed. Cir. 2002). The issue is whether there is an apparent reason to combine the known elements in the fashion claimed by the patent at issue. KSR.

For at least the foregoing reasons, the cited references fail to teach or suggest the features of the invention or even motivate one skilled in the art in that regard. Even in the various combinations, the present invention as recited in independent claim 35 (and its dependent claims) would not have been obvious to one skilled in the art.

CONCLUSION

In view of the above amendments and remarks, Applicant believes the pending application is in condition for allowance.

CONDITIONAL REQUEST FOR INTERVIEW

If for any reason, the Examiner does not consider this application in condition for allowance upon entry of the within Amendment, an interview with the Examiner is respectfully requested prior to issuance of any further written communication.

FEE AUTHORIZATION

No fees are believed to be due. However, should any fees be asserted, the Commissioner is authorized to charge such fees (or credit any overpayment) to Deposit Account No. 04-1105, Reference No. 63265(45107).

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Respectfully submitted,

Electronic signature: /Christine C. O'Day/
Christine C. O'Day
Registration No.: 38,256
EDWARDS ANGELL PALMER & DODGE
LLP
P.O. Box 55874
Boston, Massachusetts 02205
(617) 517-5558
Attorneys/Agents For Applicant